Patent Claims

1. Water treatment agent for the long-term improvement of the water quality of biological maintenance systems, characterised by a content of

   a) at least one easily or sparingly soluble Al^{3+}, Fe^{3+}, TiO^{2+} or ZrO^{2+} salt of an organic carboxylic acid, possibly in admixture with an organic carboxylic acid;

   b) at least one water-soluble N-free, biologically decomposable organic compound;

   c) at least one soluble alkali metal or alkaline earth metal salt of an organic carboxylic acid and

   d) at least one Mg^{2+} salt of an organic carboxylic acid, possibly in admixture with at least one Ca^{2+} salt of an organic carboxylic acid, as well as

   e) trace elements and vitamins, especially water-soluble vitamins of the B series.

2. Agent according to claim 1 containing

   a) an Al^{3+}, Fe^{3+}, TiO^{2+} and/or ZrO^{2+} acetate, formate, tartrate and/or especially citrate;

   b) at least one carboxylic acid, an alcohol and/or a sugar;

c) an alkali metal or alkaline earth metal salt of citric, acetic, lactic, tartaric, formic or malic acid and

d) a Ca^{2+} or Mg^{2+} salt or a mixture of Ca^{2+} and Mg^{2+} salts of organic carboxylic acids, as well as

e) trace elements and vitamins, especially water-soluble vitamins of the B series.

3. Agent according to claim 1 or 2, containing aluminium citrate and/or iron citrate as component a).

4. Agent according to claim 1 or 2, containing as component b) acetic, citric, tartaric or lactic acid, glycerol, sorbitol or ethanol or a pentose, a hexose or saccharose.

5. Agent according to claim 4 containing as component b) a combination of citric acid, tartaric acid and saccharose.

6. Agent according to claim 1 or 2 containing as component d) a sodium and/or magnesium salt of citric and/or tartaric acid.

7. Agent according to claim 1 or 2 containing as component e) magnesium citrate and/or tartrate, possibly in admixture with calcium citrate and/or tartrate.

8. Agent according to claim 1 or 2 containing as trace elements iron, boric acid, bromide, iodide, lithium, tin, manganese, zinc, nickel, copper, vanadium, molybdenum and/or cobalt.

9. Agent according to claim 1 or 2 containing as vitamins vitamin B1, B2, B6, B12, nicotinic acid amide, panthenol and/or biotin.

10. Agent according to claims 1 to 9 containing, per dosage unit for 1 l of maintenance water, the components in the following amounts:

a) 0.5 - 50 mg, preferably 0.5 - 10 mg;

b) one or more organic compounds, preferably citric acid, saccharose and/or tartaric acid, in each case 0.5 - 100 mg, preferably 0.5 - 50 mg, especially preferably 1 - 20 mg;

c) 0.018 - 1.8 mmol alkali metal salt, preferably 0.036 - 0.36 mmol, or 0.009 0.9 mmol alkaline earth metal salt, preferably 0.018 0.18 mmol, or corresponding mixtures of alkaline earth and alkali metal salts;

d) 0.0018 - 0.36 mmol magnesium salt, preferably 0.018 - 0.18 mmol;

e) 1 - 100 µg iron, preferably 2 20 µg;
0.5 - 50 µg boric acid, preferably 0.5 - 10 µg;
0.1 - 100 µg bromide, preferably 0.1 - 5 µg;
0.01 - 100 µg iodide, preferably 0.1 - 10 µg;
1 - 200 ng lithium, preferably 5 - 100 ng;
1 - 200 ng tin, preferably 5 - 100 ng;
0.1 - 100 µg manganese, preferably 0.2 - 20 µg;
0.1 - 100 µg zinc, preferably 0.1 - 10 µg;
0.01 - 20 µg nickel, preferably 0.05 - 5 µg;

0.01 - 20 µg copper, preferably 0.05 - 5 µg;

1 - 500 ng vanadium, preferably 5 - 100 ng;

1 - 500 ng molybdenum, preferably 5 - 100 ng;

0.1 - 50 ng cobalt, preferably 0.5 - 20 ng;

0.1 100 µg vitamin B1, preferably 0.1 50 µg;

0.05 50 µg vitamin B2, preferably 0.05 10 µg;

0.01 30 µg vitamin B6, preferably 0.05 10 µg;

0.05 - 50 ng vitamin B12, preferably 0.1 - 10 ng;

0.1 - 50 µg nicotinic acid amide, preferably 0.1 - 20 µg;

0.1 - 100 µg panthenol, preferably 0.1 - 10 µg; and

0.01 - 10 µg biotin, preferably 0.01 - 1 µg.

Summary

There is described a composition for the long-term improvement of the water quality of biological maintenance systems characterised by a content of

1) at least one easily or sparingly soluble Al^{3+}, Fe^{3+}, TiO^{2+} or ZrO^{2+} salt of an organic carboxylic acid, possibly in admixture with an organic carboxylic acid;

2) at least one water-soluble N-free, biologically decomposable organic compound;

3) at least one soluble alkali metal or alkaline earth metal salt of an organic carboxylic acid and

4) at least one Mg^{2+} salt of an organic carboxylic acid, possibly in admixture with at least one Ca^{2+} salt of an organic carboxylic acid, as well as

5) trace elements and vitamins, especially water-soluble vitamins of the B series.

With the help of the described composition, changes of the water quality-determining parameters can be reduced, minimised or eliminated and thus a significant reduction of the partial water exchange frequency or a distinct prolongation of the water exchange-free intervals achieved therewith.